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Laboratory

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BIOTERRORISM AND CHEMICAL TERRORISM PREPAREDNESS UPDATE

By Marion Fowler MT(ASCP)

The most recent meeting of the Bioterrorism Identification Subcommittee met at the Delaware Public Health Laboratory (DPHL) on November 3, 2005. The committee decided that the name of the group was no longer appropriate and was changed to the Laboratory Preparedness Advisory Committee (LPAC). The following topics were discussed during the meeting:

- Kathy Gray, the new Laboratory Information Management System (LIMS) administrator, updated the committee on the status of the DPHL LIMS system. New forms are now available for all the clinics and hospital laboratories in Delaware. The long-term goal of LIMS is to have patient information and reports available using web access. Kathy has also been named the training coordinator for DPHL as well as for all of Delaware's sentinel laboratories and is a member of the National Laboratory Training Network (NLTN).
- Nancy Valeski and Sue Shore presented a PowerPoint presentation on the Food Emergency Response Network (FERN). DPHL has been testing food for years for pathogenic organisms, including *Salmonella, Shigella, E. coli* 0157:H7 and *Listeria.* Since September 11, 2001, we now include BT

organisms like anthrax, *Francisella, Brucella* and *Yersinia pestis.* DPHL works together with FERN to validate methodologies, pre vent outbreaks and prepare for food-related emergencies. DPHL will respond to emergencies in conjunction with other FERN laboratories in the nation to restore confidence in the food supply.

- Testing for shigatoxin surveillance, which was part of the Epidemiology and Laboratory Capacity grant, has been discontinued by DPHL; however, the antimicrobial resistance program is still in force. Please continue to send DPHL resistant organisms isolated from sterile sites. A finalized list of reportable diseases and organisms to be sent to DPHL will be available in February.

DPHL will be providing a new type of training for sentinel laboratory personnel. During the week of March 27, 2006, DPHL and the

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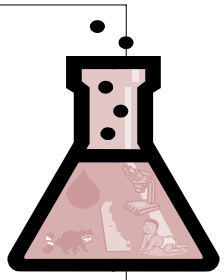

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Special Points of Interest

- Visit Our New Website!

INFLUENZA LABORATORY TESTING IN DELAWARE

By Jane Getchell, DrPH, Jong-ho Jean, Ph.D., Susan Dee, BA, Mary Ann Brown MT,SM, Anna Linz, BS and Jill Walters, MLT

The Delaware Public Health Laboratory is one of the collaborating laboratories worldwide providing testing data and information to assist the World Health Organization (WHO) in formulating vaccines for future years.

The DPHL has committed to WHO for year-round surveillance in recent years. As shown in Figure 2, peak activities for the last influenza season were in mid-February and mid-March of 2005.

In addition to the detection and identification of influenza viruses, DPHL performed differential testing for other respiratory viruses from specimens requesting flu tests. Several other viruses were isolated from these specimens for the year 2004-05, including 6 isolates of adenovirus, 4 parainfluenza virus type1, 2 respiratory syncytial virus (RSV) and 1 herpes simplex virus. Recovering viruses other than influenza has been one of the benefits of the large increase in specimens submitted over the last few years.

In 2006, the program will continue to provide year-round laboratory services for real-time polymerase chain reaction (PCR), virus isolation and typing/sub-typing of influenza viruses. All health care providers and sentinel physicians will be provided with influenza specimen collection kits year-round. Data will be provided promptly to our clients, to the Delaware Public Health-Epidemiology Section and to the CDC electronically. All of these laboratory tests are free of charge to our clients.

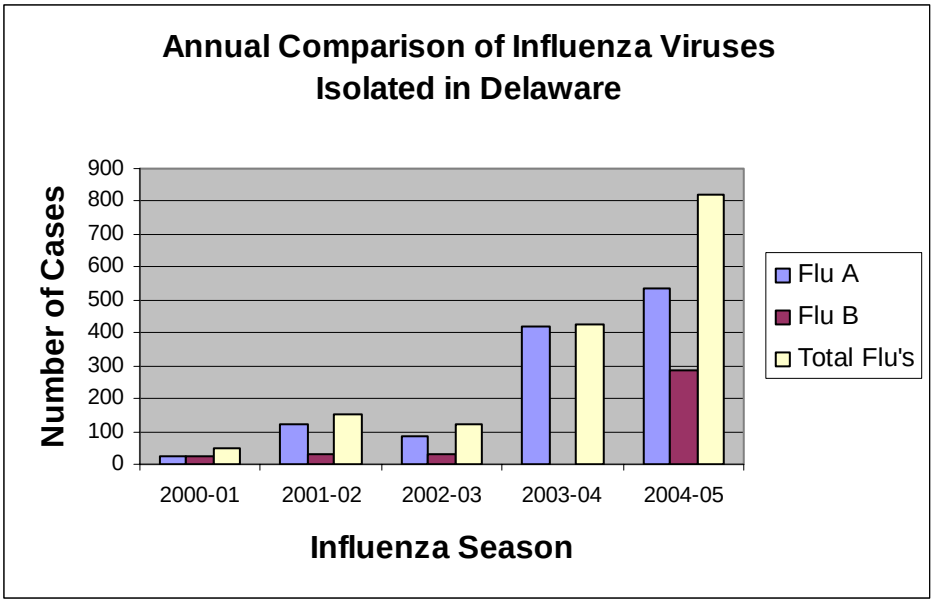
To improve our turn-around time and sensitivity, the DPHL is currently establishing a shell vial system for rapid isolation of influenza and other respiratory viruses. R-Mix is a patented mixed monolayer of human adenocarcinoma cells and mink lung cells. R-Mix has particular application to respiratory viruses that include influenza A & B, RSV, adenovirus and parainfluenza viruses 1, 2 & 3. It also supports the growth and recovery of humanmetapneumo virus. Using an inverted fluorescent microscope for rapid blind staining, influenza A and B can be detected as early as 6 hours.

Influenza virus is a significant cause of morbidity and mortality each year and has caused three major pandemics in 1918, 1957, and 1968, killing more than a half-million Americans. The recent spread of highly pathogenic avian influenza in poultry in East Asia (H5N1), Canada (H7N3), and the Netherlands (H7N7), has intensified concern over the potential for an influenza pandemic. The same strain of avian flu virus seen in chickens and ducks has been detected in humans. Once that crossover from bird to human has occurred, the spread of the virus within the general population could be devastating.

It has been reported that migratory waterfowl (duck, geese) may carry flu viruses in their intestines and shed them in their secretions and excretions. As these waterfowl migrate around the globe, they may introduce new flu strains into domestic poultry and swine. These strains may recombine with local human strains and form a new virus capable of being transmitted from human to human. This would pose a tremendous public health challenge.

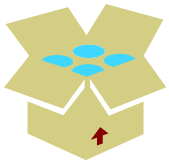
According to a 2005 WHO conference report on "Influenza A/H5N1 in Humans in Asia", preliminary analyses suggest that H5N1 influenza viruses being isolated from humans during the early months of 2005 are drifting antigenically and genetically from their 2004 predecessors. The H5N1 virus isolated from the northern and southern parts of Vietnam tend to fall into different groups. Moreover, H5N1 viruses isolated during 2004 from humans with severe respiratory infections were very similar to isolates from avian species in the same country. H5N1 human and avian viruses isolated in Cambodia, Laos, Malaysia, Thailand, and Vietnam clustered within clade 1, while H5N1 viruses from birds in China, Indonesia, Japan, and South Korea clustered into a second clade with greater genetic divergence.

Growing virus in cell culture is important for influenza diagnostics because it confirms that the virus is infectious. This year, the DPHL is able to identify and differentiate influenza A (H1N1) and A (H3N2), and influenza B/Shanghai-like and B/Hong Kong-like strains. If epidemiological information suggests that a human case of influenza might be due to infection with avian influenza A (H5N1), or another highly pathogenic avian flu virus strain. The DPHL will perform real-time PCR testing. PCR has the advantages of faster turn-around time and ability to detect non-infectious viral particles. Moreover, PCR can also be used to distinguish the strains of influenza virus (H1, H3, H5 and H7). If specimens cannot be subtyped using available techniques, or if H5 or H7 is detected, the specimens will be sent to CDC for further testing.



RECENT CHANGES IN PACKAGING AND SHIPPING REGULATIONS

By Tara Lydick, DPHL Chemical Terrorism Coordinator



Changes in International Air Transport Association (IATA) Dangerous Goods regulations went into effect July 2005 for class 6.2 Infectious Substances. One specific change requires an additional statement for air transport: "I declare that all of the applicable air transport requirements have been met." This is in addition to the proper labeling, packaging and classification certification statement.

Packing Instruction 904 is still required for any specimen being shipped with dry ice. The largest change is that the previous four risk classification groups (diagnostic; infectious low; infectious moderate; infectious high) are gone and have been replaced with the following three categories:

1. "Suspected Category A Infectious Substance", which is an infectious substance when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease to humans or animals. Category A follows Packing Instruction 602, and falls under UN2900 (animal) and UN2814 (human). These materials are primarily select agent or extremely virulent. A published list of these materials can be found on: www.therapak.com/docs/CatAInfSub.pdf. The technical name can be omitted on the Shipper's Declaration and replaced with "Suspected Category A infectious substance". Additionally, an itemized list of contents may describe contents as "suspected category A infectious substance" when pathogen is unknown.
2. "Biological Substance Category B", is diagnostic specimens that do not meet category A requirements, primarily the former category "Diagnostic Specimens". The major change is replacing the term "Diagnostic Specimens" with "Biological Substance Category B" on the label with UN3373. Category B still follows Packing Instruction 650.
3. "Exempt (Human/Animal) Specimens", which does not have a formal packing instruction. These are patient specimens where there is minimal likelihood that pathogens are present and the specimen is transported in a packaging which will prevent any leakage. The Recommended packaging includes:
   a. The primary receptacle containing the specimen.
   b. A secondary packaging such as a plastic Ziplock bag with adequate absorbent material.
   c. Outer packaging (box, carton, cooler, etc.) with biohazard symbol and "Exempt Human Specimen" or "Exempt Animal Specimen" label.
   d. One surface of the package must have a surface with minimum dimensions of at least 100 mm x 100 mm (4" x 4") to allow for proper labeling.

Chemical Terrorism at DPHL is planning a "Shipping & Packaging of Diagnostic Specimens and Infectious Substances" (SPDSIS) review class as well as a "Collection, Packaging, and Shipping of Chemical Terrorism Specimens" (CPS-CTS) class for February 2006. These classes can be conducted at participant's sites (New Castle, Kent, Sussex) if attendance requirements are met (minimum of eight people). Emergency Departments and Pre-Hospital providers are *strongly* encouraged to participate. DPHL will also be participating through the LRN-C with local hospitals and collection points in a Collection, Packaging, and Shipping Exercise in Spring 2006. The exercise will involve small numbers of samples, chain of custody, request for testing, and documentation issues. Please contact Tara Lydick by email (Tara.Lydick@state.de.us) or by telephone (302) 223-1520 to sign up for the training classes or for any questions regarding these exercises or Chemical Terrorism.

DPHL Welcomes New Employees

Our newest Chemist III is **Jacqueline "Jaccie" Barnes**, who joined the Chemical Terrorism section on October 3, 2005. She worked with Battelle at Edgewood Proving Grounds in Maryland as a Mustard Gas Destruction Chemist, bringing extremely valuable knowledge and skills. Prior to her work there, she worked for Avecia Pharmaceuticals as a quality control leader and shift supervisor and is a former US military medical technician and phlebotomist. Her previous work makes her the ideal candidate for CT's current and future blood based methods: Cyanide, volatile organic compounds (VOCs), pesticides, and blood lead. Jaccie can be found smiling in the CT lab working hard to validate the cyanide in whole blood by GC/MS method to be potentially used as part of a fire victim and fire fighter blood level study Her rye sense of humor and willingness to pitch in where ever needed have provided some much needed humor and laughter to CT.

Kathy Gray was hired as the System Administrator for our new Laboratory Information Management System (LIMS). She previously worked in the lab's Virology section as a Microbiologist II. As the System Administrator for LIMS she will be responsible for adding new users to the system and assigning security levels, modifying test fields and screens and creating ad hoc reports. She will be interfacing with users outside the lab in health clinics and other state agencies to get them connected to the LIMS, provide training, and solve any problems that may arise. When everyone is comfortable with LIMS and all areas are running smoothly, Kathy will take on the added responsibility of Training Coordinator. As Training Coordinator she will connect laboratory staff with appropriate training opportunities, provide training information to all Delaware laboratorians, assist in organizing training, assess training needs, and represent Delaware as a member of APHL's National Laboratory Training Network.

Please join the EMM Lab in welcoming our new Lab Manager, **Rebekah Parsons**! Rebekah has worked as a research associate at the University of Delaware for the past 5 years in a research laboratory studying the structure and function of the simian virus 40 tumor antigen (T antigen) and, also, of the cellular proteins that interact with it in virus infected and transformed cells. She focused closely on T antigen's role in the initiation and elongation phases of SV40 DNA replication and the recruitment of various proteins to the origin. Prior to employment at UD, she was employed at the University of Pittsburgh in a laboratory which was working mainly with E. coli and H. flu toward the production of a vaccine against otitis media. Rebekah also enjoys spending time with her daughters, and boy does she like coffee!

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"To Protect and Enhance the Health of the People of Delaware"

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Bioterrorism and Chemical Terrorism Preparedness Update
Continued

NLTN will jointly sponsor a "wet workshop" course for BT training. This course is designed for bench technologists. Previous training used only case studies and PowerPoint presentations to train personnel. The wet workshop will use mimic organisms or non-virulent agents to provide hands-on training. Culture plates and gram stains of the organisms will be examined. For more information about this course, please contact Marion Fowler at marion.fowler@state.de.us. There will be a very limited amount of space available due to the nature of this course. A variety of other training will be available to sentinel laboratories, investigational response teams (IRT) and emergency room personnel. In early spring, a packaging and shipping course and instructions for chain of custody procedures will be provided for both BT and CT. This is open to all sentinel laboratory personnel, emergency room personnel and the IRTs.

The next LPAC meeting will be held on April 13th, 2006 at the Preparedness Training Room at the Blue Hen Corporate Center in Dover, Delaware from 9:00 am to 1:00 pm.

www.dhss.delaware.gov/dhss/dph/lab/labs.html